Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Withdrawn) A fuel cell system, comprising:

a fuel cell stack;

a battery;

a series pass element electrically coupled between at least a portion of the fuel cell stack and a portion of the battery; and

a regulating circuit for regulating current through the series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error.

2. (Withdrawn) The fuel cell system of claim 1 wherein the regulating circuit comprises:

a battery charging current error integrator having a first input coupled to receive a battery charging current signal and a second input coupled to receive a battery charging current limit signal;

a battery voltage error integrator having a first input coupled to receive a battery voltage signal and a second input coupled to receive a battery voltage limit signal; and

a stack current error integrator having a first input coupled to receive a stack current signal and a second input coupled to receive a stack current limit signal.

3. (Withdrawn) The fuel cell system of claim 1 wherein the regulating circuit comprises:

a charge pump; and

a level shifter coupled between the charge pump and the series pass element.

4. (Withdrawn) The fuel cell system of claim 1 wherein the regulating circuit comprises:

an OR circuit.

5. (Withdrawn) The fuel cell system of claim 1 wherein the regulating circuit comprises:

a first diode having an anode and a cathode, the anode coupled to receive the battery charging current error;

a second diode having an anode and a cathode, the anode coupled to receive the battery voltage error; and

a third diode having an anode and a cathode, the anode coupled to receive the stack current error, where the cathode of each of the first diode, the second diode and the third diode are coupled to one another to form an analog OR circuit.

6. (Withdrawn) The fuel cell system of claim 1 wherein the regulating circuit comprises:

a battery charging current error integrator having a first input coupled to receive a battery charging current signal and a second input coupled to receive a battery charging current limit signal;

a battery voltage error integrator having a first input coupled to receive a battery voltage signal and a second input coupled to receive a battery voltage limit signal;

a stack current error integrator having a first input coupled to receive a stack current signal and a second input coupled to receive a stack current limit signal;

a first diode having an anode and a cathode, the anode coupled to the battery charging current error integrator;

a second diode having an anode and a cathode, the anode coupled to the battery voltage error integrator; and

a third diode having an anode and a cathode, the anode coupled to the stack current error integrator, where the cathode of each of the first diode, the second diode and the third diode are coupled to one another to form an analog OR circuit;

a level shifter electrically coupled between the analog OR circuit and the series pass element; and

a charge pump coupled to supply a charge to the series pass element via the level shifter.

7. (Withdrawn) The fuel cell system of claim 1 wherein the series pass element comprises a field effect transistor.

8. (Withdrawn) The fuel cell system of claim 1 wherein at least a portion of the battery is electrically coupled in parallel with at least a portion of the fuel cell stack.

9. (Withdrawn) A fuel cell system, comprising:

a number of fuel cells forming a fuel cell stack;

a number of battery cells forming a battery;

a series pass element;

a blocking diode electrically coupled between the fuel cell stack and the series pass element; and

a regulating circuit for regulating current through the series pass element in proportion to at least a greater of a difference between a battery charging current and a battery charging current limit, a difference between a battery voltage and a battery voltage limit, and a difference between a stack current and a stack current limit.

10. (Withdrawn) The fuel cell system of claim 9 wherein the regulating circuit comprises:

a battery current integrator having a first input, a second input and an output, the first input coupled to receive a battery current value and the second input coupled to receive a battery current limit value;

a battery voltage integrator having a first input, a second input and an output, the first input coupled to receive a battery voltage value and the second input coupled to receive a battery voltage limit value;

a stack current integrator having a first input, a second input and an output, the first input coupled to receive a stack current value and the second input coupled to receive a stack current limit value; and

an OR circuit coupled to the output of each of the battery current integrator, the battery voltage integrator and the stack current integrator to select the greater of a value on each of the respective outputs.

11. (Withdrawn) The fuel cell system of claim 9 wherein the regulating circuit comprises:

a level shifter electrically coupled between the OR circuit and the series pass element; and

a charge pump coupled to provide current to the series pass element through the level shifter.

12. (Withdrawn) The fuel cell system of claim 9 wherein the regulating circuit comprises:

a battery current integrator having a first input, a second input and an output, the first input coupled to receive a battery current value and the second input coupled to receive a battery current limit value;

a battery voltage integrator having a first input, a second input and an output, the first input coupled to receive a battery voltage value and the second input coupled to receive a battery voltage limit value;

a stack current integrator having a first input, a second input and an output, the first input coupled to receive a stack current value and the second input coupled to receive a stack current limit value; and

an OR circuit coupled to the output of each of the battery current integrator, the battery voltage integrator and the stack current integrator;

a level shifter coupled to the OR circuit to receive the greater of the value on each of the outputs; and

a charge pump coupled to the series pass element through the level shifter.

13. (Withdrawn) The fuel cell system of claim 9 wherein the regulating circuit comprises a microprocessor programmed to regulate the current through the series pass element by:

integrating a difference between a battery current and a battery current limit;

integrating a difference between a battery voltage and a battery voltage limit;

integrating a difference between a stack current and a stack current limit;

selecting a greater of the integrated differences; and

applying a control signal to the series pass element proportional to the greater of the integrated differences.

14. (Withdrawn) The fuel cell system of claim 9, further comprising:

a battery charging current sensor;

a battery voltage sensor; and

a stack current sensor.

15. (Withdrawn) The fuel cell system of claim 9, further comprising:

a battery charging current sensor;

a stack current sensor;

battery voltage sensor;

a battery temperature sensor; and

a temperature compensation circuit coupled to the battery temperature sensor to produce a battery voltage limit that is temperature compensated.

16. (Currently Amended) A control circuit for a fuel cell system having a fuel cell stack and a battery, the control circuit comprising:

a series pass element electrically coupleable between at least a portion of the fuel cell stack and a portion of the battery; and

a regulating circuit for linearly regulating current through the series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error.

17. (Original) The control circuit of claim 16 wherein the regulating circuit comprises:

a battery charging current error integrator having a first input coupled to receive a battery charging current signal proportional to a battery charging current, a second input coupled to receive a battery charging current limit signal proportional to a battery charging current limit, and an output to supply a battery current error signal proportional to a difference between the battery charging current and the battery charging current limit;

a battery voltage error integrator having a first input coupled to receive a battery voltage signal proportional to a battery voltage, a second input coupled to receive a battery voltage limit signal proportional to a battery voltage limit, and an output to supply a battery voltage error signal proportional to a difference between the battery voltage and the battery voltage limit;

a stack current error integrator having a first input coupled to receive a stack current signal proportional to a stack current, a second input coupled to receive a stack current limit signal proportional to a stack current limit, and an output to supply a stack current error signal proportional to a difference between the stack current and the stack current limit; and

an OR circuit coupled to the output of each of the error integrators to select a greater one of the error signals from the error integrators.

18. (Original) The control circuit of claim 16 wherein the series pass element comprises a transistor having a first terminal, a second terminal and a control terminal, the first and the second terminals coupleable between the fuel cell stack and the battery, and wherein the regulating circuit comprises:

a level shifter coupled to receive the greater of the battery charging current error, the battery voltage error and the stack current error; and

a charge pump coupled to the control terminal of the transistor by way of the level shifter.

19. (Original) The control circuit of claim 16 wherein the regulating circuit comprises:

a first diode having an anode and a cathode, the anode coupled to receive the battery charging current error;

a second diode having an anode and a cathode, the anode coupled to receive the battery voltage error; and

a third diode having an anode and a cathode, the anode coupled to receive the stack current error, where the cathode of each of the first diode, the second diode and the third diode are coupled to one another to form an analog OR circuit.

20. (Original) A control circuit for a fuel cell system, comprising:

a series pass element;

a blocking diode electrically coupled in series with the series pass element; and

a regulating circuit coupled to the series pass element to regulate a current through the series pass element in proportion to at least a greater of a difference between a battery charging current and a battery charging current limit, a difference between a battery voltage and a battery voltage limit, and a difference between a stack current and a stack current limit.

21. (Original) The control circuit of claim 20, further comprising:

a battery charging current sensor;

a battery voltage sensor; and

a stack current sensor.

22. (Original) The control circuit of claim 20 wherein the regulating circuit comprises:

a battery current integrator having a first input, a second input and an output, the first input coupled to receive a battery current value and the second input coupled to receive a battery current limit value;

a battery voltage integrator having a first input, a second input and an output, the first input coupled to receive a battery voltage value and the second input coupled to receive a battery voltage limit value;

a stack current integrator having a first input, a second input and an output, the first input coupled to receive a stack current value and the second input coupled to receive a stack current limit value; and

an OR circuit coupled to the output of each of the battery current integrator, the battery voltage integrator and the stack current integrator to select the greater of a value on each of the outputs.

23. (Original) The control circuit of claim 20 wherein the regulating circuit comprises:

a battery current integrator having a first input, a second input and an output, the first input coupled to receive a battery current value and the second input coupled to receive a battery current limit value;

a battery voltage integrator having a first input, a second input and an output, the first input coupled to receive a battery voltage value and the second input coupled to receive a battery voltage limit value;

a stack current integrator having a first input, a second input and an output, the first input coupled to receive a stack current value and the second input coupled to receive a stack current limit value;

an OR circuit coupled to the output of each of the battery current integrator, the battery voltage integrator and the stack current integrator to select the greater of a value on each of the outputs;

a level shifter coupled to the OR circuit to receive the greater of the value on each of the outputs; and

a charge pump coupled to the series pass element through the level shifter.

24. (Original) The control circuit of claim 20 wherein the series pass element comprises a field effect transistor.

25. (Original) A control circuit for a fuel cell system, comprising:

a battery charging current sensor;

a battery charging current error integrator having a first input coupled to the battery charging current sensor to receive a battery charging current signal proportional to a battery charging current, a second input coupled to receive a battery charging current limit signal proportional to a battery charging current limit, and an output to supply a battery current error signal proportional to a difference between the battery charging current and the battery charging current limit;

a battery voltage sensor;

a battery voltage error integrator having a first input coupled to the battery voltage sensor to receive a battery voltage signal proportional to a battery voltage, a second input coupled to receive a battery voltage limit signal proportional to a battery voltage limit, and an output to supply a battery voltage error signal proportional to a difference between the battery voltage and the battery voltage limit;

a stack current sensor;

a stack current error integrator having a first input coupled to the stack current sensor to receive a stack current signal proportional to a stack current, a second input coupled to receive a stack current limit signal proportional to a stack current limit, and an output to supply a

stack current error signal proportional to a difference between the stack current and the stack current limit;

an OR circuit coupled to the output of each of the battery current error integrator, the battery voltage error integrator and the stack current error integrator; and

a series pass element having a pair of terminals for selectively providing a current path and a control terminal coupled to the OR circuit for regulating current through the current path in proportion to a greater of the battery current error signal, the battery voltage error signal and the stack current error signal.

26. (Original) The control circuit of claim 25 wherein the regulating circuit comprises a number of discrete integrators.

27. (Original) The control circuit of claim 25 wherein the regulating circuit comprises an analog OR circuit.

28. (Original) The control circuit of claim 25 wherein the regulating circuit comprises a microprocessor.

29. (Original) The control circuit of claim 25, further comprising:

a temperature compensation circuit coupled to the battery temperature sensor to produce a battery voltage limit that is compensated for temperature.

30. (Original) A control circuit for a fuel cell system, comprising:

means for determining a greater of a difference between a battery charging current and a battery charging current limit, a difference between a battery voltage and a battery voltage limit, and a difference between a stack current and a stack current limit; and

series pass regulating means for regulating a flow of stack current through a blocking diode in proportion to the determined greater difference.

31. (Original) The control circuit of claim 30, comprising:

integrating means for determining the difference between the battery charging current and the battery charging current limit;

integrating means for determining the difference between the battery voltage and the battery voltage limit; and

integrating means for determining the difference between the stack current and the stack current limit.

32. (Original) A control circuit for a fuel cell system, comprising:

means for determining a difference between a battery charging current and a battery charging current limit;

means for determining a difference between a battery voltage and a battery voltage limit; and

means for determining a difference between a stack current and a stack current limit; and

series pass regulating means for regulating a flow of stack current through a blocking diode in response to the greater of the determined differences.

33. (Original) The control circuit of claim 32, further comprising:

means for selecting the greater of the determined differences.

34. (Original) The control circuit of claim 32, further comprising:

means for selecting the greater of the determined differences; and

means for applying a signal to a control terminal of the series pass regulating means proportional to the greater of the determined differences.

35. (Withdrawn) A method of operating in a fuel cell system, the method comprising:

determining a battery charging current error;

determining a battery voltage error;

determining a stack current error; and

regulating current through a series pass element in response to a greater of the battery charging current error, the battery voltage error and the stack current error.

36. (Withdrawn) The method of claim 35 wherein,

determining a battery charging current error includes integrating a difference between a battery charging current and a battery charging current limit over time;

determining a battery voltage error includes integrating a difference between a battery voltage and a battery voltage limit over time; and

determining a stack current error includes integrating a difference between a stack current and a stack current limit over time.

37. (Withdrawn) The method of claim 35, further comprising:

selecting the greater of the battery charging current error, the battery voltage error and the stack current error;

level shifting the selected one of the battery charging current error, the battery voltage error and the stack current error; and

applying the level shifted selected one of the battery charging current error, the battery voltage error and the stack current error to a control terminal of the series pass element.

38. (Withdrawn) The method of claim 35, further comprising:

determining a temperature proximate a battery;

determining a battery voltage limit based at least in part on the determined temperature; and

integrating a difference between a battery voltage and the determined battery voltage limit over time to determine the battery voltage error.

39. (Withdrawn) The method of claim 35, further comprising:

selectively coupling charge from a charge pump to a control terminal of the series pass element in response to the greater of the battery charging current error, the battery voltage error and the stack current error.

40. (Withdrawn) The method of claim 35, further comprising:

selectively coupling charge from a charge pump to a control terminal of the series pass element in response to the battery charging current error at a first time, the battery voltage error at a second time and the stack current error at a third time.

41. (Withdrawn) A method of operating in a fuel cell system, the method comprising:

determining a difference between a battery charging current and a battery charging current limit;

determining a difference between a battery voltage and a battery voltage limit;

determining a difference between a stack current and a stack current limit; and

regulating a current through a series pass element in proportion to at least a greater of the difference between the battery charging current and the battery charging current limit, the difference between the battery voltage and the battery voltage limit, and the difference between the stack current and the stack current limit.

42. (Withdrawn) The method of claim 41, further comprising:

selecting the greater of the battery charging current error, the battery voltage error and the stack current error;

level shifting the selected one of the battery charging current error, the battery voltage error and the stack current error; and

applying the level shifted selected one of the battery charging current error, the battery voltage error and the stack current error to a control terminal of the series pass element.

43. (Withdrawn) The method of claim 41, further comprising:

determining a temperature proximate a battery;

determining the battery voltage limit based at least in part on the determined temperature.

44. (Withdrawn) The method of claim 41, further comprising:

selectively coupling charge from a charge pump to a control terminal of the series pass element in proportion to the greater of the battery charging current error, the battery voltage error and the stack current error.

45. (Withdrawn) The method of claim 41, further comprising:

selectively coupling charge from a charge pump to a control terminal of the series pass element in proportion to the battery charging current error at a first time, the battery voltage error at a second time and the stack current error at a third time.

46. (Withdrawn) A fuel cell system, comprising:

a voltage bus;

a first fuel cell stack electrically couplable across the voltage bus;

a first battery electrically couplable across the voltage bus;

a first series pass element electrically coupled in series on the voltage bus between at least a portion of the first fuel cell stack and a portion of the first battery;

a first regulating circuit for regulating current through the first series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error;

a second fuel cell stack electrically couplable across the voltage bus;

a second battery electrically couplable across the voltage bus;

a second series pass element electrically coupled in series on the voltage bus between at least a portion of the second fuel cell stack and a portion of the second battery; and

a second regulating circuit for regulating current through the second series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error.

47. (Withdrawn) The fuel cell system of claim 46 wherein the second fuel cell stack, the second battery and the second series pass element are electrical coupled in series with the first fuel cell stack, the first battery and the first series pass element.

48. (Withdrawn) The fuel cell system of claim 46 wherein the second fuel cell stack, the second battery and the second series pass element are electrical coupled in parallel with the first fuel cell stack, the first battery and the first series pass element.

49. (Withdrawn) The fuel cell system of claim 46, further comprising:

a third fuel cell stack electrically couplable across the voltage bus;

a third battery electrically couplable across the voltage bus;

a third series pass element electrically coupled in series on the voltage bus between at least a portion of the third fuel cell stack and a portion of the third battery; and

a third regulating circuit for regulating current through the third series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error.

50. (Withdrawn) The fuel cell system of claim 46, further comprising:

a third fuel cell stack electrically couplable across the voltage bus;

a third battery electrically couplable across the voltage bus;

a third series pass element electrically coupled in series on the voltage bus between at least a portion of the third fuel cell stack and a portion of the third battery; and

a third regulating circuit for regulating current through the third series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error, wherein the second fuel cell stack, the second battery and the second series

pass element are electrical coupled in series with the first fuel cell stack, the first battery and the first series pass element and wherein the third fuel cell stack, the third battery and the third series pass element are electrical coupled in series with the first and the second fuel cell stack, the first and the second battery and the first and the second series pass element.

51. (Withdrawn) The fuel cell system of claim 46, further comprising:

a third fuel cell stack electrically couplable across the voltage bus;

a third battery electrically couplable across the voltage bus;

a third series pass element electrically coupled in series on the voltage bus between at least a portion of the third fuel cell stack and a portion of the third battery; and

a third regulating circuit for regulating current through the third series pass element in response to a greater of a battery charging current error, a battery voltage error and a stack current error, wherein the second fuel cell stack, the second battery and the second series pass element are electrical coupled in series with the first fuel cell stack, the first battery and the first series pass element and wherein the third fuel cell stack, the third battery and the third series pass element are electrical coupled in parallel with the first and the second fuel cell stack, the first and the second battery and the first and the second series pass element.